

**Subpart E—Gaseous Exhaust Test Procedures****§ 91.401 Scope; applicability.**

(a) This subpart describes the procedures to follow in order to perform exhaust emission tests on new marine gasoline-fueled spark-ignition propulsion engines subject to the provisions of subpart A of this part 91. Provisions specific to raw gas sampling are in §§91.414 through 91.419, provisions specific to constant volume sampling are in §§91.420 through 91.426. All other sections in this subpart apply to both raw gas sampling and constant volume sampling unless indicated otherwise.

(b) Requirements for emission test equipment and calibrating this equipment are found in subpart D of this part.

**§ 91.402 Definitions.**

The definitions in §§91.3, 91.102, and 91.302 apply to this subpart.

**§ 91.403 Symbols and abbreviations.**

(a) The abbreviations in §91.5 apply to this subpart.

(b) The symbols in Table 1 in appendix A to subpart D apply to this subpart.

**§ 91.404 Test procedure overview.**

(a) The test consists of prescribed sequences of engine operating conditions to be conducted on an engine dynamometer or equivalent load and speed measurement device. The exhaust gases generated during engine operation are sampled either raw or dilute, and specific components are analyzed through the analytical system.

(b) The tests are designed to determine the brake-specific emissions of hydrocarbons, carbon monoxide, and oxides of nitrogen. The test consists of one idle mode and four power modes with an exponential relationship between torque and speed which span the typical operating range of spark-ignition marine propulsion engines. These procedures require the determination of the concentration of each pollutant, fuel flow, and the power output during each mode. The measured values are weighted and used to calculate the

grams of each pollutant emitted per brake kilowatt hour (g/kW-hr).

(c)(1) When an engine is tested for exhaust emissions the complete engine is tested, with all emission control devices installed and functioning.

(2) Additional accessories (for example, oil cooler, alternators, and so forth) may be installed, but such accessory loading will be considered parasitic in nature and observed power is used in the emission calculation.

(d) All emission control systems installed on or incorporated in the application must be functioning during all procedures in this subpart. In cases of component malfunction or failure, no maintenance is allowed without prior approval from the Administrator in accordance with §91.118.

**§ 91.405 Recorded information.**

(a) Record the information described in this section for each test where applicable.

(b) *Test data; general.* (1) Engine identification number.

(2) Engine emissions control system.

(3) Test operator(s).

(4) Number of hours of operation accumulated on the engine prior to beginning the warm-up portion of the test (to the nearest tenth hour).

(5) Fuel identification.

(6) For two-stroke engines, fuel/oil mixture ratio.

(7) Date of most recent analytical assembly calibration.

(8) All pertinent instrument information such as tuning, gain, serial numbers, detector number, and calibration curve numbers. As long as this information is traceable, it may be summarized by system number or analyzer identification numbers.

(c) *Test data; pre-test.* (1) Date and time of day.

(2) Test number.

(3) Barometric pressure; as an option, barometric pressure can be measured as a modal measurement instead of or in addition to a pre- and post-test measurement.

(4) Recorder chart or equivalent. Identify for each test segment zero traces for each range used, and span traces for each range used.

(d) *Test data; modal.* (1) Recorder chart or equivalent. Identify for each